



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/771,092	01/26/2001	William D. Fisher	10003512-1	7692

7590 02/23/2004

AGILENT TECHNOLOGIES
Legal Department, 51U-PD
Intellectual Property Administration
P.O. Box 58043
Santa Clara, CA 95052-8043

EXAMINER

GORDON, BRIAN R

ART UNIT	PAPER NUMBER
----------	--------------

1743

DATE MAILED: 02/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

Office Action Summary

Application No.

09/771,092

Applicant(s)

FISHER, WILLIAM D.

Examiner

Brian R. Gordon

Art Unit

1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12-18-03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 27-42 is/are pending in the application.
- 4a) Of the above claim(s) 27-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 35-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7-3-03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

Art Unit: 1743

DETAILED ACTION

Election/Restrictions

1. As stated in the previous office action, claims 27-34 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claims 27 and 31 do not require a device that comprises a chamber and a thermoelectric or piezoelectric ejector in the chamber. The method of claims 27 and 31 may be practiced by another materially different apparatus.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 27-34 withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03. The restriction is hereby made final.

Response to Arguments

Applicant's arguments, see applicants remarks, filed December 18, 2003, with respect to the rejection(s) of claim(s) 1-14 and 35-42 under Kutami et al. have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Bares et al. and Clark et al.

Drawings

2. The drawings were received on July 7, 2003. These drawings are approved.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

Art Unit: 1743

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 11, 31 and 35-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 11, and 31 are directed to a method of dispensing however it is unclear what occurs or what is the significance of striking the device. Does further dispensing occur upon striking the device?

If no dispensing occurs upon striking the device as claimed in claim 31, what is the purpose of striking the device.

The claim is so broad that it is unclear what is the intent and purpose of each step given in the claims. It would be difficult for one to practice the invention as claimed with the intentions as disclosed in the specification. From reading the claims as presently drafted, one would not clearly ascertain what is the intent of the method. As a result one may omit the step of striking for it appears to have no significance in the claimed method.

As to claims 35 and 36, the term "improves pulse jet firing reliability" in claims 35-36 is a relative term which renders the claim indefinite. The term "improves" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. As to improving the jet firing reliability, the claim is not directed to any quantification standard for which one to compare the reliability of the device. It would be relative to ones personal view if the striking improves reliability.

Art Unit: 1743

Since no standard is given for one to determine if the reliability improves, the claims are hereby rejected.

Applicant amended the claim to cite the improvement is relative to the firing of the device absent striking. The neither specification nor claims provide any numerical standard to determine what applicant considers as improved reliability. Is the reliability directed to the devices ability to dispense accurate amounts of liquid? If so, is there a significant difference in the accuracy absent the striking to actually determine that there is a distinct improvement in the method? Does firing reliability refer to the devices ability to dispense a high number of drops without error or malfunction? If so what are the statistical differences in the operation of the device absent striking versus the instant method?

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

Art Unit: 1743

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
7. Claims 1-12 and 35-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bares et al. US 5,023,625 in view of Clark et al. US 5,536,471.

Bares et al. discloses an invention to overcome the inability of the natural ink feed capillary action to adequately supply ink to a ink jet printhead during high frequency operation (pulse jet operation) and thereby extend F_{\max} beyond its present limits.

The device comprises a resistive heater element 11 (thermoelectric transducer) that is aligned with respect to an orifice plate, and an ink flow path supplies ink into a chamber or reservoir between the resistive heater element and the orifice plate. This improved system includes, among other things: 1) a piezoelectric system which is mounted internal to the ink cavity of an ink jet printhead; 2) an external piezoelectric system which is mounted directly on the orifice plate of an ink jet printhead; 3) dual independent piezoelectric systems which are both mounted internal to the ink cavity of the printhead; and 4) dual piezoelectric systems with one being internal to the ink cavity of the printhead and the other being external and mounted directly on the orifice plate of the printhead. The above described ink feed systems may be used to: 1) produce oscillations of controlled frequency, F_m , and controlled amplitude, I_m , of the ink meniscus at the ink ejection orifice and produce the ejection of ink drops from a single orifice with varying and controlled volumes; 2) extend the maximum frequency of operation, F_{\max} , of the ink jet printhead; and 3) extend the viscosity range of inks which may be used.

Art Unit: 1743

In accordance with the invention, a piezoelectric material 22 such as quartz or barium titanate crystals or a kynar piezoelectric film is introduced into the ink cavity 14 as shown in FIG. 5, or is mounted externally on the outer surface of the orifice plate 16 as shown in FIG. 6. The material 22 is connected in such a manner that it can be energized with a controlled electrical signal, and this signal induces oscillations, of controlled frequency and magnitude, within the material 22. This action in turn produces a positive ink pressure within the ink cavity 14 and the ink channel 13 and thereby behaves as an ink pump. Both **internally** and externally mounted piezoelectric systems function in an equivalent manner.

The timing of the firing of resistor 11 with respect to the meniscus amplitude, l_m , of the induced meniscus oscillations is crucial. If the resistor 11 is fired at the equilibrium position, or points (T) in FIG. 4B, the ink jet printhead is operating in the "equilibrium mode" and medium volume ink drops, V_{eq} , are ejected. These ejected ink drops are of a volume equal to the case where the piezoelectric material is not pulsed.

The range of ejected ink drop volume may be extended by employing dual independently controlled piezoelectric systems within an ink jet printhead. FIG. 7 illustrates such a system where both independently controlled piezoelectric drivers 22 are incorporated within the ink cavity 14.

Bares et al. does not mention striking the dispenser in order to remove air bubbles.

Clark et al. discloses a bubble flushing device for aspirating and dispensing fluids through an open-ended tip with precision and volumetric accuracy.

Art Unit: 1743

Clark further discloses that it is known clinical analyzers require that fluids be aspirated and dispensed with precision and volumetric accuracy. The performance of prior syringes used for aspirating and dispensing fluids is severely degraded by the presence of air bubbles in the syringe and remaining portion of the fluidic system. Existing syringes fail to provide means for effectively removing such bubbles from the fluidic system. For example, the cumbersome manual practice of tapping the syringe to remove bubbles is well-known. Thus, there is a need to provide a syringe for aspirating and dispensing fluids through the open ended of the tip of a pipettor with precision and volumetric accuracy as a result of its ability to automatically flush bubbles out of the fluidic system.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bares et al. by employing the teachings of Clark et al. and striking or tapping the syringe to remove bubbles in order to provide for accurate and precise dispensing of fluids.

As to claims 5-8, Bares in view of Clark does not specifically recite a particular strike rate or the amount of energy delivered by each strike.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the modified method of Bares by applying the appropriate strike rate and energy to remove the air bubbles as found necessary by the operator to increase the efficiency and accuracy of the modified device.

Art Unit: 1743

8. Claims 13-14 and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bares et al. in view of Clark as applied to claims 1-12 and 35-40 above, and further in view of Ellson et al. US 6,548,408.

Bares et al. in view of Clark et al. do not disclose that the device comprises the device is employed for arraying DNA.

Ellson et al. disclose a dispensing device employed to eject a plurality of immiscible fluids including DNA from reservoirs in order to form a pattern, e.g., an array, on the substrate surface.

It would have been obvious to one of ordinary skill in the art to recognize that the modified device of Bares et al. in view of Clark et al. may be employed to eject samples for a device comprising a thermoelectric or piezoelectric ejector allows for the dispensing of fluids having various viscosities.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure Mutz et al., Deeg et al., Dante et. al., Silverbrook, Oeftering, Reinten, Gutierrez et al., Pickrell, Sharma, Hotomi, and Asakawa et al. disclose piezoelectric or thermoelectric ejectors.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian R. Gordon whose telephone number is 571-272-1258. The examiner can normally be reached on M-F, with 2nd and 4th F off.

Art Unit: 1743

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 571-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

brg


Jill Warden
Supervisory Patent Examiner
Technology Center 1700